

WHAT IS CLAIMED IS:

1. A negative-working image forming process which comprises the steps of:

(1) flood exposing with actinic radiation a photosensitive assembly that comprises:

5 (a) a hydrophilic support which can be used as a lithographic base and having thereon;

(b) a first layer comprising:

(i) at least one polymer that is soluble or dispersible in an aqueous alkaline solution;

(c) a second layer on top of the first layer, the second layer comprising at least one o-quinonediazide compound; whereby the flood exposure causes the at least one o-

10 quinonediazide compound to be converted to the corresponding indenecarboxylic acid compound; and

(d) at least one photothermal conversion material in either the first layer or the second layer or both;

(2) imagewise exposing the flood exposed photosensitive assembly with infrared radiation to thereby convert the indenecarboxylic acid compound in the second layer in the imagewise exposed areas to the corresponding indene compound; and

(3) developing the imagewise exposed photosensitive assembly with an alkaline developing solution to dissolve out the imagewise unexposed areas of the second layer and the areas of the first layer underlying the imagewise unexposed areas of the second layer and thereby produce a 20 negative working image.

2. The process of claim 1 wherein the support is a polyester film.

3. The process of claim 1 wherein the support is a sheet of anodized aluminum.

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4. The process of claim 1 wherein the polymer in the first layer is a copolymer having at least one functional group selected from the group consisting of carboxylic acid, N-substituted cyclic imide, amide, and mixtures thereof.

30 5. The process of claim 1 wherein the o-quinonediazide compound comprises either (i) a mixture of a phenolic resin and an o-naphthoquinone diazide compound; (ii) a reaction product of a resin and an o-naphthoquinone diazide compound; or (iii) a mixture of (i) and (ii).

6. The process of claim 1 wherein the at least one photothermal conversion material is at least one infrared absorbing compound.

5 7. The process of claim 6 wherein the at least one infrared absorbing compound is in the second layer.

8. The process of claim 7 wherein the infrared absorbing compound is a dye or pigment.

10 9. The process of claim 1 wherein the thickness of the first layer is from about 0.5 to about 2.5 microns.

10. The process of claim 1 wherein the thickness of the second layer is from about 0.5 to about 2.5 microns.

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11. A negative-working image forming process which comprises the steps of:

(1) flood exposing with UV radiation a photosensitive assembly that comprises:

(a) an aluminum plate hydrophilic support which can be used as a lithographic base and having thereon;

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(b) a first layer comprising:

(i) at least one copolymer that is soluble or dispersible in an aqueous alkaline solution and has at least one functional group selected from the group consisting of carboxylic acid, N-substituted cyclic imide, amide, and mixtures thereof;

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(c) a second layer on top of the first layer, the second layer comprising at

least one o-quinonediazide compound that comprises either (i) a mixture of a phenolic resin and an o-naphthoquinone diazide compound; (ii) a reaction product of a resin and an o-naphthoquinone diazide compound; or (iii) a mixture of (i) and (ii); whereby the flood UV exposure causes the at least one o-quinonediazide compound to be converted to the corresponding indenecarboxylic acid compound; said second layer additionally containing an infrared absorbing compound;

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(2) imagewise exposing the flood UV exposed photosensitive assembly with infrared radiation to thereby convert the indenecarboxylic acid compound in the second layer in the imagewise exposed areas to the corresponding indene compound; and

(3) developing the imagewise exposed photosensitive assembly with an alkaline developing solution to dissolve out the imagewise unexposed areas of the second layer and the areas of the first layer underlying the imagewise unexposed areas of the second layer and thereby producing a negative working image.

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12. The process of claim 11 wherein copolymer in the first layer comprises at least 90% by weight of the first layer.

13. The process of claim 11 wherein the amount of infrared absorbing compound in the  
10 second layer is sufficient to provide an optical density of at least 0.5 in that layer.

14. The process of claim 11 wherein the developing solution has a pH from about 8 to about 13.5.

15. 15. A negative-working image-forming process which comprises the steps of:

(1) flood exposing with UV radiation a photosensitive assembly that comprises:

(a) an anodized aluminum plate hydrophilic support which can be used as a lithographic base and having thereon;

(b) a first layer comprising:

20 (i) terpolymer of methacrylamide, methacrylic acid and N-phenylmaleimide that is soluble or dispersible in an aqueous alkaline solution;

(c) a second layer on top of the first layer, the second layer comprising at least one o-quinonediazide compound that comprises either (i) a mixture of a phenolic resin and an o-naphthoquinone diazide compound; (ii) a reaction product of a resin and an o-naphthoquinone diazide compound; or (iii) a mixture of (i) and (ii); whereby the flood UV exposure causes the at least one o-quinonediazide compound to be converted to the corresponding indenecarboxylic acid compound; said second layer additionally containing an infrared absorbing compound;

30 (2) imagewise exposing the flood UV exposed photosensitive assembly with infrared laser radiation to thereby convert the indenecarboxylic acid compound in the second layer in the imagewise exposed areas to the corresponding indene compound; and

(3) developing the imagewise exposed photosensitive assembly with an alkaline developing solution to dissolve out the imagewise unexposed areas of the second layer and the areas of the first layer underlying the imagewise unexposed areas of the second layer and

thereby producing a negative working image.

16. The process of claim 15 wherein the first layer additionally contains a colorant and a coating improver.

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17. The process of claim 15 wherein the terpolymer in the first layer comprises mole fractions of 35:20:45 of the methacrylamide, methacrylic acid and N-phenylmaleimide.

18. The process of claim 15 wherein the second layer additionally contains compounds selected from the group consisting of colorants, other sensitizers, stabilizers, exposure indicators, and surfactants.